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THE ULTIMATE ATTRIBUTES OF REALITY[1]

THE problem of substance and attributes is somewhat out of fashion since the dominance of modern idealism. It has become a habit to think of reality simply in terms of experience, and reflective experience at that. It seems to me, however, that with our new epistemological tools we are in a position to take up seriously some of the metaphysical problems. Pragmatism, as a movement, has been disappointing in this respect. This is due to the fact that the pragmatic method has been lost in the subjectivism of its advocates.

Substance has come to have a distinct scientific meaning in modern times. So far as it is profitable to revive the Spinozistic conception of substance, it would now amount to an epistemological postulate that facts are part of one world in such a way that every fact can, under certain conditions, make a difference to other facts. What those conditions are, it is for science to investigate. The differences must also be capable of becoming differences to a reflective consciousness under certain conditions, in order to concern us.

These differences are capable of being systematized into certain attributes or categories or dimensions, according to your predilection for terms. My reflections have led me to believe that there are four such attributes irreducible to terms of each other, *viz.*, stuff, time, space and direction. Future investigation will have to determine how far these are ultimate attributes and whether there are others.

The method which we shall pursue will be that of scientific induction instead of *a priori* deduction. No category must be assumed which is not necessitated by the adjustments within experience. In the nature of things, to fill out a complete scheme of categories would be to furnish a complete science of the universe. This, of course, is out of the question. All we can hope to do is to ascertain the fundamental attitudes necessitated by reality.

The classical discussion of substance and attributes goes back to

[1] Read before the Western Philosophical Association in Chicago, March 30, 1907.

Spinoza. Spinoza makes causal difference, as well as conceptual, depend upon the possession of a common attribute on the part of the facts. This, evidently, is a confusion of causal processes with logical classification. But the conception of action of like upon like is still prominent in our conception of causality, and still hampers us in trying to deal with the complexity of reality and its various grades.

The same reality, according to Spinoza, figures in different worlds. Thus substance may figure as both thought and extension. It must also figure in infinite other ways not included in experience. Thus substance must possess not only all the attributes there is evidence of, but infinite others. This is the medieval dogma of the *ens realissimum* of which we still find evidence in the idealist's conception of infinite variety in which his absolute must revel.

It is not necessary to point out that Spinoza is inconsistent with his own thesis, that everything within reality must be conceived with reference to a context, or, as he would put it, must have a common attribute with the rest of reality. He is inconsistent, first, as regards the relation between thought and extension, for extension must be conceived, and so must be capable of making a difference to thought. To be indifferent to thought would be to be without significance. He is still more inconsistent as regards his infinite attributes. These, by hypothesis, make no difference to thought, and yet are assumed. On the contrary, in so far as we make an *a priori* assumption, we must start with a finite number of attributes. Else knowledge becomes impossible. As a matter of fact, there can be only as many attributes as make a difference to judging or reflective experience. The question whether these are altered by being known can have no meaning, since it is only for reflective experience that there are attributes.

It is unnecessary to point out that the attribute of extension of Spinoza can not be made an independent attribute apart from experience. Extension is as much a subjective quality as is color or tone. This has been pointed out sufficiently by both empiricists and rationalists since Spinoza. That leaves us only one attribute, namely, thought or experience, of all Spinoza's attributes; and, on the whole, modern philosophy has attempted to express reality in terms of this. Space and time, since Kant, have been regarded as subjective or phenomenal. Absolute idealism, moreover, has found no difficulty in getting rid of the dualism of the *is* and the *ought* by reducing the latter to terms of the former. These are costly sacrifices in the service of simplicity. Can we reconstruct our universe thus? I believe not.

Modern science, in so far as it has been allowed to pursue its own

task, unhampered by metaphysical suppositions, whether of the materialistic or idealistic sort, has always insisted upon as many attributes or dimensions as the facts seem to require. These seem to be three for natural science: space, time and energy. The conception of energy has gradually supplanted the conception of mass as a universal unit of description. Mass is applicable only within a limited field. It is not applicable, for example, to electricity; while energy in its transformations can be made to cover the whole extent of process.

In spite of the fact that natural science has found it necessary to work with these three attributes, it has failed to define its dimensions in any clear way. The attempt at simplification has always made itself felt. Thus space and time have been regarded as pure quantity. But if space and time are pure quantity, how can they be given definite meaning? We must look for the differentia of these attributes. Not the serial tools, which they have in common, but their specific character, is what we must try to get at.

Not only has the attempt been made to reduce time and space to pure quantity, but the same attempt has been made in regard to mass. Thus Karl Pearson would reduce mass to acceleration. But if mass or energy is pure quantity, how can we get the different units with which quantity must deal? Quantity, obviously, means something different, whether it is concerned with chemical elements or electric potentials or neural reactions. But this only shows the confusion that has been too prevalent in the analysis of scientific concepts.

Moreover, natural science has neglected one attribute which is fundamental for its whole procedure. It has assumed at the outset that the universe has meaning. This is not deducible from the three dimensions with which natural science expressly deals. It does not follow from the mere conception of energy, nor does it follow from the conception of time or of space. We may find, therefore, that there is another dimension, neglected, because presupposed, by natural science.

It must be obvious now what we are about. While this inquiry did not start from the assumptions of science, it must be a matter of more than curious coincidence that the metaphysical needs and the scientific needs seem to correspond. Applying the pragmatic criterion, that we must assume only such realities as can make a real difference to our reflective experience, I have arrived at the conclusion that reality can not be expressed in less than four dimensions. These dimensions I now proceed to define:

The first that I shall deal with is that of being or stuff. The stuff that has been emphasized by modern idealism is meaning stuff,

our reflective purposes. These are of final importance for understanding the world. They enable us to differentiate the processes and spread them out in series. Similarity, difference, causality, reciprocity, etc., as general categories or modes of functioning on the part of the reflective ego, must be regarded as stuff also. This reflective stuff is partly content stuff, partly tendency stuff, which makes the particular content significant. I want to point out, however, that in order to make a difference to reflective experience reality need not necessarily be reflective.

On the contrary, reflective experience will be seen to be dependent upon non-reflective processes. The meaning of the object reflected upon depends largely upon its unnoticed background. There are three ways in which attention may be dependent upon unnoticed facts. Thus, processes not attended to may be the larger associative context, the background of feeling and tendency, of the object. The different meaning of man or evolution to the scientist and to the common man is largely in the 'fringe.' Or the unnoticed may be instrumental to the activity of attention without itself being attended to. For example, the words on the page that we read. We have a very different consciousness when we are attending to the meaning of the words from what we have when we make the words themselves the objects of attention. There may be processes, however, which are entirely irrelevant to the purposive consciousness of the moment, as well as unnoticed by it. Thus the pressure of our clothes, the furniture of the room, the temperature, etc., even though not attended to, make a difference to our consciousness which we can easily see by an alternation of these processes. We have a very different consciousness in reading a book out of doors under the open sky from what we have in reading the same book in our own study, though in either case we may not be attending to the setting. If we want one name for all these various unnoticed mental processes I would suggest subattentive, not subconscious, which at best is misleading.

But not only are there conscious processes beyond the circle of reflective thought and making a difference to it; there are processes which we can not speak of as conscious at all, which still make a difference to our reflective meaning. That I can take up the problems of yesterday or last year to-day, and thus connect again with my own past, seems to be dependent upon a continuity of processes which are not themselves conscious. The unity of the passing thought can account for the continuity of our consciousness only while we are conscious. It can not bridge over the gap between going to sleep and waking up again, or account for the bringing back of experiences which have not been active in the meantime. What these non-con-

scious processes are in their own inwardness, we shall never be able to tell. But one thing is certain, and that is the close relation between what we call physical energy and our mental activities. It is a commonplace that a cup of hot coffee may change our emotional attitude toward the world. But I suppose we would not on that account be guilty of speaking of the coffee as emotional stuff. We have gotten over the notion that one process in order to make a difference to another must be of the same kind. Chemical energy is not the same as electrical, though transformable into it. So different are the conceptual tools which we need in each case that electrical energy is sometimes spoken of as immaterial. This, I take it, only signifies that the conception of mass is inapplicable. The difficulty of finding a common denominator between psychic processes and physiological seems still greater, yet they are clearly interdependent. All we can hope to do in science, and science must here be our last word, is to show definitely the conditions under which the transformations take place. The *how* of the process may forever escape us.

As regards, then, the stuff character of reality, we have found it convenient to look at it as of three grades. These grades can be seen in a cross section, as it were, of every reflective moment, the reflective consciousness showing its dependence upon marginal or unnoticed consciousness, and this again upon processes to which no consciousness can be ascribed, and which, for want of a better term, we speak of as physical.

Stuff has the advantage that it can be observed directly. It is an object of immediate perception and judgment. The other attributes of which we shall speak, *viz.*, space, time and direction, can only be observed or make a difference to our judgment through the difference they make to the stuff structure of the world, including our own purposes.

I shall speak of these attributes as non-being attributes, not because they are less real, but because they are not statable as stuff. In the language of modern philosophy the stuff attribute has appropriated the term being. These non-being attributes can be defined or differentiated from each other by the difference which they make to the active purposes of the self.

I have dealt with the attributes of time and space at some length elsewhere, and so shall make only a brief statement in regard to my position here.[2] It has been the custom, since Kant, to deal with these

[2] For the fuller discussion of time and space, see especially the author's monograph 'Time and Reality,' *Psychological Review*, Monograph Series, No. 26; and his articles on 'Space and Reality,' in this JOURNAL, Vol. III., pp. 533 and 589.

attributes as series and therefore to insist upon their ideal character. I have insisted, on the other hand, that the serial character is relative, and that the real differentia must be found in characters of reality which are not themselves serial, but furnish the rationale of the serial construction. If you speak of time and space, for example, as pure quantity, there remains the problem of stating the relation of time and space to the general concept of quantity, on the one hand, and to show their differentia with reference to each other, on the other hand; that is, the whole problem of definition remains. In what, in other words, lies the difference in our purposive attitude in measuring space and time?

To speak first of time. What difference does time make to the realization of our purposes? Time necessitates new judgments, whether because of transformation and novelty in the subject or in the object. If we are compelled to make new judgments, whether the cause of new judgments is in the real object or in the real subject (in either case it must be in the latter), then reality is not expressible in static categories.

It matters not, for this purpose, how you ultimately conceive the stuff of the world. You may conceive the process as the rearrangement of permanent bits. Even then you must have something besides the bits and their position to account for the process of the perceptual world. I do not see, myself, how the bits can be indifferent to the rearrangement they must suffer, except as they are recognized as merely our conceptual models. But whether you conceive the stuff of reality in the last analysis as atoms or monads or simple qualities or as purposive systems of meanings, the question remains: When you have thus conceived reality, why should it slip away? Why does it not remain chained in the present, as Parmenides would say? Why should there be rearrangement, whether a running up or a running down process? As the world has no beginning, neither process can be absolute, for then the world must have run its course countless ages ago. The theory that the world tends to an equilibrium or an equal distribution of heat, as implied in Spencer's formula and the second law of thermodynamics, presupposes a finite creation of the world. If you say, again, that the present rearrangement is the result of previous rearrangements, and so on *ad infinitum*, why should there be rearrangement at all? Why should not our positional values remain fixed? Why should something creep into our equations, whether subjectively or objectively, so as to make them false? If you insist that reality remains fixed, there at least remains the appearance of rearrangement in the subject, and that is part of reality and must be met.

If you say that energy is the cause of rearrangement, then you

must at least furnish an intelligible idea of energy. All that we can mean by energy, if we consult scientific advance so far, is such a degree of uniformity as makes prediction possible. But this is the very opposite characteristic from that required for rearrangement. In our own willing, energy would then mean the constancy involved in the realization of our purposes or meanings. That the purpose itself shall have new meaning as the result of the realization can not be stated in terms of energy.

Change, again, is a composite concept and must be analyzed. To say that rearrangement in the object or new judgments from the point of view of the subject are due to change, is at best clumsy tautology and not scientific definition. It simply amounts to saying that change occurs because of change. Neither is the concept of chance serviceable, for chance is merely a subjective attitude, an attitude of at least partial ignorance of the structure of things.

Given, on the other hand, time, as a real character of the world, you can account for the transformation of values or the instability of positions or the falsifying of our judgments, which is what it all amounts to in the end. You can also furnish the rationale for our serial construction to meet such a character of the world. But you can not derive the time character from series. The construction of time infinities is thus a secondary affair, and can neither explain nor invalidate the real time character. We should not say that things move in time. This is putting the cart before the horse. Our serial construction is made necessary, on the other hand, because of the transformation of our facts and values.

And now a word about space. If time makes the difference of transformation, space conditions translation. If time makes an intrinsic difference to our processes, space makes an extrinsic difference. The character of space, in other words, is such that it does not interfere with movement. If space offered resistance, geometry, which is based on free mobility, would be impossible. It matters not for our purposes whether space be actually empty or not. It is convenient, at least for scientific purposes, to posit space as a limit of exhaustion and as the absence of resistance, *i. e.*, to assume a space zero. Only thus can we state Newton's first law of motion. Moreover, if we can approximate to such a limit, it must be as objectively real as though we had actually attained it.

Space makes the difference of distance, as well as that of free mobility. As distance, it conditions the equations of the astronomer and the realization of human ethical purposes. If I wish to communicate with a friend across the sea, it makes a decided difference as regards the kind of communication and the sort of relations that are possible between us, that he is some thousands of miles away.

Things can not move in serial space. Motion in an ideal system is meaningless. Serial space, on the contrary, is an ideal construction to symbolize the relations of things, whether physical masses or geometrical figures or self-conscious individuals, in zero space. If space were merely an ideal system, distance and free mobility would both be figurative without any reality for the figure. If we admit a real zero space, we can easily account for phenomenal or serial space, but not *vice versa.*

I grant cheerfully that all our quantitative measurements are relative. Our serial constructions, our geometrical and chronological models, are our tools by means of which we strive to meet the actual nature of the world. But I do not see how any mere shifting of point of view, as from the human to the absolute, can rid us of characters of reality which condition all our real purposes, whether as regards transformation or translation.

I anticipate the most difficulty from the fourth attribute of which I am going to speak, *viz.,* ought or direction. I admit that this attribute is an afterthought, but the afterthought need not be the less true. We have tried so far to state the universe in terms of three attributes, those of stuff or energy, time and space. But none of these attributes answer the question: Does the process have meaning, or is there validity in the flux? This is not accounted for by stuff, for the stuff character does not contain its own measure. It is precisely because the process is not what it ought to be, because our finite structures are relative, that the question of validity is raised. The question is not answerable in terms of time, for time merely means transformation. Whether transformation towards chaos or towards unity is not answered by time. It is not statable as space, for while space conditions the realization of meaning, it does not constitute meaning or value. But there remains somehow within us the longing for finality; the merely relative fails to satisfy us.

When we insist that there ought to be truth, beauty and goodness, in spite of the relativity of history and our individual judgments, we have at least implied a limit, a direction of history which is not relative. Else all our judgments would be equally meaningless and there could be no degrees of truth, as in the dark all cows are gray.

The absolute idealist insists that in the absolute experience we have such a standard. This absolute experience is even now shared by us. It is this that gives rise to our consciousness of fragmentariness, which accounts for our finite sense of failure, and of which we are even now conscious as the final truth, the purpose eternally fulfilled. But the irony of history gives the lie to any such assumption. The absolute itself is subject to the transmutation of time.

It is the expression of the finite now. Each stage of the process must create its own absolute, find its own satisfaction. The absolute, therefore, is merely an ideal, though convenient, limit. Ontologically, it is relative. It, too, presupposes direction for such validity as it has.

That the idea of direction is valuable as a regulative idea or limit, can not be doubted. But can we also attribute ontological reality to the same? Or is it merely a hypothetical limit, the index of our ideal strivings? It seems to me, if it is required to give meaning to our relative and fragmentary purposes, that it must be at least as real as those purposes themselves. Else all validity becomes impossible. To guarantee the meaning of the process or to furnish the basis for science, the direction must be selective, that is, must condition the survival of structures. Only thus can it satisfy that demand for finality which the finite process fails to fulfill. It is the spirit of truth which is with us always to the end of the eons.

Taking reality, then, at its face value as a stream of processes, it seems to me that it takes at least four dimensions or independent variables to define it: stuff or energy, which furnishes us with our various types of uniformity or expectancy, whether psychological or physical; time, which looked at objectively accounts for rearrangement or passing, looked at subjectively accounts for the instability of our judgments and values; space, which furnishes the possibility of free translation and distance; and direction, which furnishes the limit, epistemological and ontological, for the measure of the validity of our purposes.

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DISCUSSION

CONTROVERSY ABOUT TRUTH

TO THE EDITORS OF THE JOURNAL OF PHILOSOPHY, PSYCHOLOGY AND SCIENTIFIC METHODS:

The pragmatistic conception of truth is so important that no amount of printer's ink spent upon it ought to be considered wasted. My exposition of it in No. 6 of this year's JOURNAL was sent back to me with copious critical annotations on its margins by Professor John E. Russell. This led to an exchange of letters between us, in which one issue, at least, got sharpened; and as that issue is probably the most prevalent stumbling-block, I ask you, in the interest of clarifying the question, to print the correspondence at it was written. I subjoin our letters.

Sincerely yours,

WILLIAM JAMES.

I

DEAR RUSSELL: Your notes bring out the exact point of misunderstanding, and the exact difficulty with which pragmatism has to cope in making converts.

You say: *"Events in the way of verification do not make an idea true, they only prove that it is true or was true"*—there is the whole difference between us in a nutshell.

The statement seems to mean that truth is a quality of the idea *numerically distinct* from the events which are its proof; but don't you then think that the said quality ought to be somehow definable as it is *in* and *per se*? I hoped for the definition as I read your comments; but in the end I found no new definition, only the old ones of 'agreement with reality' and of 'thinking the reality as it is.'

Now what does agreement mean? Does it mean anything different from (or prior to) the copyings and leadings by which pragmatism explicates the word? These are perfectly well-defined relations of the idea to the reality or to the reality's associates and surroundings.

And what does 'thinking the reality as it is' mean unless it be either copying it, or leading straight up to it, or thinking it in its right surroundings—which last notion means terminating at places to which it, the reality, also leads?

You speak of Leverrier's idea of Neptune being true before it had led him to verify it. Doubtless! but pray *define* its truth *apart* from those leadings and guidings. The word truth *means* just such leadings and guidings. Had his idea led him to point his telescope to a vacant part of the sky, it would have been untrue—is untruth, then, also a resident and previous quality in ideas? Leading to that point, Leverrier's idea certainly was true—I can conceive no other kind of truth—and, of course, quite as true when only verifiable as it was after the verification. Even so the star was Neptune both before and after its baptism, for in the star universe that star is all that Neptune ever can mean.

In the case of Neptune you don't separate the name from the fact found, and make it a cause thereof; you don't say the star was found at that point because it was Neptune; but in the case of the idea you say it led to that point because it was true. But just as Neptune means nothing but the star which at a certain moment is at that point, so true means nothing but the idea which, instead of leading you elsewhere, leads you thither. Otherwise it's like raising a dispute about whether blood is red because it looks so, or looks so because it's red. *You* ought to insist on the latter formula; *I* call them equally correct. You may say either that the leading *makes*

the idea true or that it *proves* it true, for you are only talking of the same thing in different words: The leading both makes you call the idea true, and proves that you have called it so justly.

Take another illustration. Does bread nourish us because it is food? Or is it food because it nourishes? Or, finally, are being food and nourishing only two ways of naming the same physiological events? And if this last view be correct here, why isn't it just as correct in the case of truth?

The concrete facts denoted by the word truth are ideas that guide us towards certain termini. Other connotations of the word than these same guidings it is for you to show. If you can't, then we may say either that the ideas are true because they guide, or that they guide because they are true:—To be true and to guide are precisely equipollent terms, of which you may make either you like the more primordial in significance.

Otherwise (and this is the point which I emphasize, and on which I insist) you must point out some substantive connotation in the word truth *over and above* such guiding processes. If you can do this, I surrender; but I don't see how you can do it.

It seems to me that there *is* no other connotation, any more than there is in the case of Neptune. Neptune means the star that gets *there,* and true means the idea that 'gets there.' Agreement, correspondence, thinking the object as it is, all resolve themselves into guidings, into ' getting there ' somehow. You argue as if, in spite of its getting there, an idea might still be false, unless the intrinsic epistemological virtue of being true were superadded. I wish you'd explain how. To me it couldn't be false under those circumstances.

Revert to food. In this case we do have some additional connotations—a certain chemical structure, say—that explain the physiological events in advance. (We know nothing of such connotations as yet, but we suppose they may some day be known.) If the word food should connote primarily such chemical structure, and only secondarily digestions, absorptions, etc., then you might contend that bread nourishes because it is food, and isn't food because it nourishes. But you would still be on purely verbal ground; and even then you would have to define positively these new-fangled connotations.

Meanwhile please observe that the word true has absolutely no such further connotations; it has no more of them than Neptune has. It denotes certain ideas, and it connotes their 'getting there.'

Here I must leave the matter. As a pragmatist, I can defy you to find any other practical meaning to the word truth than that it guides and gets us there. If, *failing to do that,* you nevertheless

call our account an inadequate account of what you mean by truth, why then, again as a pragmatist, I can wash my hands of the whole controversy. It is trivial. It has no meaning.

Yours, etc.,

WILLIAM JAMES.

II

DEAR JAMES: I think the issue between the intellectualist and the pragmatist narrows itself down to the question of the validity and value of two distinctions. The first is the distinction between the idea's being true and the *proof* that the idea is true. The second distinction is that between a true idea and its instrumental function in leading, guiding behavior to desirable issues in experience.

The intellectualist insists that these distinctions are valid and important to a right conception of knowledge. The pragmatist denies this; he contends that the terms 'true,' 'truth,' 'leading,' 'guiding,' 'getting there,' etc., are different names for the same thing; that the term truth applied to an idea has the same function that the name Neptune, for instance, has when applied to a particular planetary body in the heavens. The pragmatist, after having made 'agreeing with reality,' 'being as it is thought,' etc., mean leading, guiding, coming into practical relations with, getting there, etc., challenges the intellectualist to point out any other significant connection which his terms true, truth, etc., can have. The pragmatist says to the intellectualist, "I pray you to define the truth of an idea *apart* from its leadings and guidings. I defy you to supply other meanings to the word truth than that of guiding and getting us there. Does 'agreement' mean anything different from that copying and leading by which pragmatism explicates this word?"

Now this puts the intellectualist in a hard situation. If he answers, " I mean by a true idea, an idea that agrees with, that copies or corresponds to reality," the pragmatist replies, "But what *is* it to agree with, to copy, etc., reality, if it be not just to lead, to guide, to get there?" Now what can the intellectualist say in reply? Suppose he undertakes to define his meaning of truth in different terms, these terms would suffer the same fate; the pragmatist would explicate them in his terms, of leading, guiding, getting there, etc., and then ask the naked intellectualist to put on different garments.

I can see no other way by which the intellectualist can escape this dilemma than *simply to abide by the terms by which he has defined a true idea,* and insist that it is the pragmatist who has forced upon these terms a meaning they can not take without involving one in intellectual confusion. The intellectualist should, therefore, maintain that the terms in which he explicates the meaning of a true idea give a perfectly defined relation of the idea to

reality. What more definite relation can legitimately be demanded? How can the intellectualist in fairness be asked to define in other terms what he means by agreement with, by copying, by thinking reality as it is? May he not with more propriety ask the pragmatist by what right he makes these terms mean leading, guiding, getting there, etc.?

This leads me to the real issue between the intellectualist and the pragmatist, and first to that distinction between an idea's being true and the proof that it is or was true. Let us take the case of Leverrier and the discovery of the planet Neptune. We have the following things:

1. Certain perturbations in the motions of the planet Uranus which could not be explained by the influence of the known bodies of the solar system.

2. We have Leverrier's idea of a planetary body of a certain mass and position in the heavens.

3. We have the agreement between the calculated perturbations which this hypothetical body should produce in the motions of Uranus, and the actual perturbations observed.

4. We have the discovery of this planet, afterwards named Neptune, by a German astronomer who, following the suggestion of Leverrier, pointed his telescope to that exact spot in the heavens where this planet was.

Now the intellectualist contends that Leverrier's hypothetical conception was true the instant it existed in his mind, and that the trueness of his idea consisted in its agreement with a fact, a piece of reality, an object at that time existing, *viz.*, that planet occupying a particular place in the physical universe. It was the existence of Neptune then and there which made it possible for him to have a true idea at that time. Had he thought differently about this planet, this same body would have made his thought *un*true. His idea was true for *no other reason*, and true in *no other meaning* of the terms, than that it agreed with its object. Furthermore, the contention of the intellectualist is, that had Leverrier gone no farther in his undertaking, had no telescope ever discovered that planet, his idea would have been as true as it was after the discovery which completed the verification of his hypothesis. His idea did not get its quality of truth by the process of verification—this only produced the certainty in his and in other minds that this idea was true. It is one thing for an idea to be true—it is quite a different thing to *prove* that this idea is true. It is one thing to hit a mark; to *know* that you have hit the mark is a different thing. A bell may ring to let you know that you have made a bull's-eye; the ringing of the bell is the sign, the criterion, of the correctness of your aim, but it hardly

constitutes the trueness of your aim, or your making the bull's-eye. Leverrier's idea hit is mark; what was subsequently done made that fact known. Truth and verification are therefore different things, and to make the truth or the verity of an idea consist in its verification is to introduce mental confusion, and to make unintelligible such a procedure as Leverrier's in the discovery of Neptune. It is true to say that a true idea is one that can be verified, and that only true ideas can be verified, but, then, these ideas are not true *because* they are verified; they are verifiable because they are already true.

This brings the intellectualist to the second distinction upon which he insists, *viz.*, the distinction between truth and its valuation in terms of desirable experience. To say that truth should have good practical consequences, that those ideas are true which work well in practise, that every true idea leads into satisfying experiences of some sort, is to say what no intellectualist need deny. But to say that an idea is true *because* it has this practically good issue, or because it works well, is to say quite a different thing, and something which no intellectualist can accept. "There are," so contends the intellectualist, "conditions on which our human action or the course of experience depends, and to which our actions, our experiences, must conform if they are to have successful and satisfying issues. Only as a particular experience is in agreement with conditions of experience *überhaupt* can it lead to beneficial or desirable experiences. Ideas, therefore, can work well, can lead successfully, only if they first agree with reality, with the objective and determining conditions of our experience." This is just the fact that the pragmatist overlooks when he identifies the truth of an idea with its practically good leadings and consequences. He insists that truth shall be practical, but he fails to answer the question, *How* can an idea, or a course of experience, have a practically good leading or result?

To take your illustration of bread as food: you ask, "Does bread nourish because it is 'food,' or is it food because it nourishes? Or are being food and nourishing only two ways of meaning the same physiological events?" The intellectualist answers, "Bread nourishes us because it contains those chemical elements which are nutritive. A particular substance is not bread because it nourishes—it nourishes because it is bread. Being food and nourishing *are* two ways of meaning the same physiological events; but being *bread* and nourishing are not two ways of meaning the same physiological events."

The intellectualist need not deny that a true idea has an instrumental function in relation to our various needs; that a true idea is a tool to be used in the service of the will or our practical nature;

but he contends that the efficiency of the instrument, the serviceableness of the tool, depends upon the construction of the instrument, upon the quality of the tool. That a knife cuts well, proves, indeed, that it *is* a good knife; but that which enables the knife to cut well is the quality of the steel and the fashion of the instrument—in other words, the knife cuts well because it was rightly made. Its cutting well merely proves that the knife *was rightly made*. The proof of the pudding is in the eating; but it will hardly do to say, therefore the good eating is the pudding, or is that in the pudding which gives us that satisfying experience of eating this pudding.

Yours, etc.,

JOHN E. RUSSELL.

III

DEAR RUSSELL: Your letter is so ultraclear and brings the question down to where the wool is so short, that I can't help dashing off one more word, though I know I can't convert you.

First, I note with extreme pleasure your explicit confession that 'truth' in the intellectualist sense can not be further defined. It means 'agreement,' and agreement means 'truth.' That is one point clearly gained.

My second remark is simply this: If 'true' be not an abstract name for the property of verifiability in an idea, then an idea might conceivably be true though absolutely unveriable. There might be no empirical mediation between it and its object, no leading either to the object, or towards it, or into its associates, and yet it might still be true as 'agreeing' with the object.

But then you are met by Royce's old argument: How do you know it *means* to be true of *that* object? It might 'agree' perfectly in the sense of copying, yet not be true, unless it *meant* to copy, *und zwar* that particular original. An egg isn't true of another egg, because it is not supposed to aim at the other egg at all, or to intend it. Neither is my toothache true of your toothache. Royce makes the absolute do the aiming and intending. I make the chain of empirical intermediaries do it. *What does it in your philosophy?*

Yours, etc.,

WILLIAM JAMES.

IV

DEAR JAMES: According to the meaning of a true idea I have been maintaining, it does follow not only that an idea is true prior to its verification, but also that an idea may remain unverified in our human experience. I would not, however, say that an idea can be true and be absolutely unverifiable; for there may be such a being as Royce's absolute, and if so, no true idea can remain unverified.

In the experience of the Roycean absolute, truth and verification do not fall apart as they do in our human experience. The Roycean question with which you confront me, I must confess, has never given me a pause or seemed a serious one at all. "How do you know that your idea means to be true of its object?" I answer, "When I think, I know what I am thinking about, just as I know what mark I am aiming at when I am engaged in target-shooting. My thinking as such is selective of its object, and knows its own intent, *viz.*, to think that object as that object is. My thought picks out this particular piece of the real world, and means to agree with it, just as I pick out my target and intend to hit it. For instance, I am now thinking of you, among your books, in your study at Cambridge; I mean to think of you and your immediate surroundings, your present doings, as you and they are now at this hour,—ten o'clock in the morning. In so doing, I know what object I mean to agree with in my present thinkings.

Now the Roycean absolute may exist, and if it does, he of course knows whether or not my present thought of you is now true; but the knowing of that being is no more necessary to constitute the truth of my idea or to explain the fact that I aim at you in my idea, than is the presence of an onlooker when I am shooting at a mark essential to my aiming at and hitting or missing that mark. Nor does it seem to me that your chain of intermediaries is in any manner essential to the meaning, the intent, or the truth of my present thought of you, which is sufficient unto itself both to select its object and to determine its truth or untruth.

Yours, etc.,

JOHN E. RUSSELL.

V

DEAR RUSSELL: We seem now to have laid bare our exact difference. According to me, 'meaning' a certain object and 'agreeing' with it are abstract notions of both of which definite concrete accounts can be given.

According to you, they shine by their own inner light and no further account can be given. They may even 'obtain' (in cases where human verification is impossible) and make no empirical difference to us. To me, using the pragmatic method of testing concepts, this would mean that the word truth might on certain occasions have no meaning whatever. I still must hold to its having always a meaning, and continue to contend for that meaning being unfoldable and representable in experiential terms.

Yours, etc.,

WILLIAM JAMES.

REVIEWS AND ABSTRACTS OF LITERATURE

Darwinism and the Problems of Life. A Study of Familiar Animal Life. CONRAD GUENTHER. Translated from the third German edition by JOSEPH MCCABE. London: A. Owen & Co. 1906. Pp. xii + 424.

This volume that had reached its third edition in the original by 1905 is one that is certain to have a high degree of usefulness. It is planned by the author to present the 'range, foundation and value' of evolutionary theories, and in its appeal to the reading public it presupposes no special knowledge of science, beyond the observations of nature and the ideas that form part of the content of every intelligent and reflective mind. It appears about the same time as two other works that also deal with the fundamentals of evolutionary science, and with its scope as well, namely, the two-volume translation of the general lectures by August Weismann, and the first part of the 'Vorlesungen über Descendenztheorien' by Lotsy. The latter is to be a thorough presentation of the whole subject with special reference to botanical material, and appeals to the specialists in general biology solely; while Weismann's book, rendered available to a wider group by the excellent English translation, is addressed to university circles primarily, and is a complete statement of this author's most important contributions considered in their relation to the whole field of evolution.

Guenther is himself a Weismannian, in the essentials of his doctrine, but his work is far from approaching a parallel of Weismann's book. For not only in the lucidity of its presentation and discussion, but in its arrangement of the materials also, it is adapted above all others as a book that may be taken up by those who possess very little idea of science, and whose ignorance leads them to hold very erroneous ideas of the present state and value of evolutionary doctrine. It is, as it were, a beautifully written 'gospel to the unscientific,' who doubt, because they are not familiar with the present state of biological knowledge, that scientific generalizations may be of service as practical guides in thought and conduct.

Without formal division, the book falls into two parts. Nine of the twelve chapters deal serially with the several phyla or major divisions of animal organisms in inverse order from the mammals down to the unicellular creatures, while the remainder is devoted to a general discussion of the main principles of the doctrine and to their extension into the so-called 'higher' realms of thought. But this latter part still retains the lucidity and clearness that characterize the earlier portion, where the manner of conveying definite ideas to the reader is all the more remarkable in its success, as there are no pictorial illustrations in the book.

The first section does not call for detailed review or description. Throughout it all, the author uses the special group under discussion to illustrate some one or some few general principles. For example, in the course of the introductory chapter, where a most vivid word-picture of

the complexity of animal relations is presented, an opportunity is found for the statement of the elements of the orthodox doctrine of natural selection, emphasis being put upon the interconnection of every organism with all other elements of its environment, be these inorganic or organic, like the individual itself or of unlike species. A most interesting view is given of human interrelations with all the creatures that with man make up a 'biocenosis,' or vital community. Again, in the second chapter, where the mammals are specifically treated, not only are the colors of animals considered as adaptive characteristics of their wearers, but the whole subject of mental evolution is outlined. The author's own statement here (p. 79) may be cited, in order to give some idea of his views upon this subject as well as of his method of presentation. "We now know that the theory of evolution need not stop short at man; that even his mind is no obstacle to our admitting his development from animal ancestors. The mind of man does not differ from that of other animals in kind but only in degree, and there is nothing to prevent us from supposing that it has been raised from the animal level by natural selection to its present altitude. Just as Copernicus smote the conceited belief out of humanity that their kingdom, the earth, was the center of the world, so Darwin has put an end to their assumption that they occupy an exceptional position on our planet. The earth is a stage of a part of the eternal, ever-changing world-mass; humanity is a phase of a part of the ever-advancing world of organic life."

Pursuing the same method, the author incidentally—one is tempted to say, insinuatingly—introduces the reader to great and wide subjects through a discussion of a concrete group of facts. Guenther takes up with the birds the subject of sexual selection, regarding which he is, of course, orthodox in the Darwinian sense; with reptiles, the nature of the paleontological evidence, and persistent types, and also regeneration as an adaptive characteristic, though here he disregards too completely, I think, the divergence in views brought out in the discussion between Weismann and Morgan; with fishes, the biogenetic law, namely, that individual development is a brief review of racial history; with insects, the Lamarckian principle of 'inheritance of acquired characters,' where he takes the extreme position of the thoroughgoing selectionist; crustacea and mollusca are used for the discussion of the chemistry of protoplasm and of metabolism; with worms and cœlenterates he discusses parasitism; and finally, in connection with the protozoa is given a very satisfactory statement of the fundamental cell theory, of the continuity of the germplasm as established by Weismann, of immortality as an original character of primitive organisms, and of the whole question as to origin of life and spontaneous generation.

But the reader will turn with greater interest to the later chapters that deal in a general way with the intrinsic nature and scope of the principles of evolution, for the elements of the subject with which the author has dealt earlier in an incidental way are, after all, biological and zoological truisms. The principal topic is, of course, the entire adequacy of natural

selection as an explanation of evolutionary method, and this writer holds firmly to the conviction that it is. Sexual selection is regarded as a complement to natural selection, as by Darwin, and not as a subordinate form of the latter. Likewise, isolation is recognized as a 'factor' in the differentiation of species, in a sense operating independently of natural selection; it—isolation—may be only "a preparatory principle . . . which *makes possible* the formation of new species. This formation may be brought about by natural selection *after* the isolation" (p. 331). But Guenther believes that isolation alone may bring about this result, without the aid of natural selection, 'if there were some force in the organisms that caused variations to advance in some definite direction in the offspring' (p. 331). And such a 'force' (*absit nomen*) is found in germinal selection as brought forward by Weismann, according to which selection operating upon and among the several parts of an organism *produces* adaptive modifications or a correlated condition of adaptation, by an intra-selective process. Orthogenesis, however, is regarded as a form of inheritance of acquired characters, and with the Lamarckian principle is thrown out bodily.

The point that merits much criticism, in the opinion of the reviewer, is the author's attitude toward the work of de Vries and others, on mutation or saltation as the method of evolution; for it is here assumed that mutation and selection are mutually exclusive processes, whereas many believe, as the evidence accumulates, that these processes are really supplementary. It is strange that an upholder of the germ-plasm theory should fail to see that the essential feature is the fixity or heritability of new or aberrant characters, and that a heritable variation or fluctuation of the Darwinian order to have a specific value should involve some chromosomal change, precisely as in the case of a mutation or sport, and that the latter differs from fluctuation only in its wider deviation from the parental type. Nor does the author seem to be aware that a mutation is not necessarily swamped by intercrossing, by 'amphimixis,' for in many of the recent experiments the new character takes precedence over its antecedent. It is strange, too, that absolutely no mention is made of the great body of results in the field of statistical study of selection and heredity, for even the works of Mendel and his followers receive no mention. In view of the vast importance of these experimental results, this is a serious omission.

With the mechanistic interpretation, as opposed to the vitalistic, nearly all will agree. While it is true that neo-vitalistic views of writers like Driesch have met with some acceptance, these are so attenuated and metaphysical that they suffer in contrast with the unified and self-consistent mechanical interpretation of the phenomena of life. The pragma-scientist (*verbum novum*) will also willingly accept the conclusion that evolutionary processes are not teleological, in the sense that an end attained controls the attainment of that end, and with this author will reject entirely 'final causes' as contrasted with 'efficient causes' for an evolutionary history.

It is difficult to follow Guenther farther, however, where he draws a sharp line between the material and the psychic, when he states that physical science in the wider sense and psychology are independent and need a new science to reconcile and unify them. It will be well to quote the last paragraph of the eleventh chapter (p. 389): ". . . It is consciousness that encloses in itself all existence, the material and the spiritual world, since both provinces can only be conceived as processes or states of consciousness. In consciousness we have a unity and a truly 'monistic' standpoint. But consciousness, the all-perceiving subject, can never become the object of an empirical science. When we wish to study it, we have to leave aside the scientific method and turn to philosophy. This is the last and highest science. It is the foundation on which every theory that aims at comprehending reality must rest. It is the undying merit of Immanuel Kant to have shown us the way to it." And yet some may be inclined to agree with the reviewer that consciousness itself can indeed be brought within the scope of scientific method and of evolutionary doctrine.

But above all else the analysis of the subjects taken up in the final chapter—'Nature History and Ethics'—demands earnest consideration. After showing that a descriptive account in biological terms may be given of the evolution of human history, social organizations and of ethical standards, the author immediately abandons all hope of unifying the worlds of 'fact' and of 'values.' He says (p. 425): "We have now reached the fundamental objection to all scientific ethics. Science regards cosmic processes merely as changes, and pays no attention to values. It abandons its methods entirely and contradicts itself when it begins to recognize values. Hence it can not have an ethics, because this has no meaning unless the moral laws that it sets up, and especially the life of man and the improvement of it, are regarded as having worth. Thus for science—to repeat our conclusion—there is no such thing as an aim, an end, or a value in the world."

Yes, in the sense that science can not ascertain the *final* causes and values of the universe—if it has any—because these do not exist in experience. What have we, as concrete individuals, living in a world of reality, to do with 'ultimates' and 'final values'? Can they be real for us? Do they mean anything at all for us? It would, of course, be a mistake to suppose that science has anything to say about that which does not exist in experience of one kind or another. But is it not equally erroneous to regard science as merely a record of events and their connections? Such a conception seems outworn by this time, when men do indeed derive practical guidance and values from their classified and unified experience—from scientific generalizations. These principles reflect us back again, in James's pregnant phrase, into the world of further experience, and they possess a worth and finality commensurate with the body of fact that they summarize, as so much 'conceptual shorthand.' Our author fails, then, to extend the scope of evolutionary method so as to include all phenomena, and many will approve his conservatism. It re-

mains for the future to show whether the pragmatic method, that of science, can be extended to the confines of human speculation, or must fail in the fields of metaphysics and philosophy.

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The Integrative Action of the Nervous System. Comprising the Silliman Memorial Lectures delivered at Yale University, 1904. CHAS. S. SHERRINGTON. New York: Chas. Scribner's Sons. 1906. Pp. xvi + 411.

The aim of this book, as its title indicates, is to set forth in detail the manner in which the nervous system serves to bring together in united action the various parts of the animal organism. There are other agencies also which bring about integration of the organism, as, for example, the mechanical union of parts by connective tissue, the union through chemical action in digestion, or through transference of fluid, as in the circulation of the blood. The integration which is the function of the nervous system, however, is unique in that 'it works through living lines of stationary cells along which it dispatches waves of physicochemical disturbance, and these act as releasing forces in distant organs where they finally impinge' (p. 3). An important characteristic of this integration, moreover, is that it is an integration of *activities*. By means of the nervous system the organism is enabled to act as a unit toward ends which the action of every part subserves.

This functional unity of the entire organism is attained through the activity of the nervous system as a coordinative mechanism. This coordination, expressed in its simplest terms, is the production of an activity which is appropriate to a given stimulus. The unit of such coordination is the reflex act, and the corresponding nervous unit is the reflex arc. The first problem which the author attacks, then, is the determination of the characteristics of simple reflex action.

The significant characteristics of reflex action are brought into relief by a comparison of conduction in the reflex arc with conduction in the nerve trunk. It is in virtue of these characteristics that the reflex arc is fitted to be a coordinative mechanism.

The differences may be enumerated as follows: In reflex arcs as compared with nerve trunks there is "(1) slower speed as measured by the latent period between application of stimulus and appearance of end effect, this difference being greater for weak stimuli than strong; (2) . . . marked 'after discharge'; (3) less close correspondence between rhythm of stimulus and rhythm of end effect" (each reflex has its own characteristic rhythm which it maintains under any adequate stimulus); "(4) less close correspondence between the grading of intensity of the stimulus and the grading of intensity of the end effect; (5) considerable resistance to passage of a single nerve impulse, but a resistance easily forced by a succession of impulses (temporal summation); (6) irreversibility of direction instead of reversibility as in nerve trunks; (7) fatigability in contrast with the comparative unfatigability of nerve trunks; (8) much

greater variability of the threshold value of stimulus than in nerve trunks; (9) refractory period, 'bahnung,' inhibition and shock, in degrees unknown for nerve trunks; (10) much greater dependence on blood circulation, oxygen . . .; (11) much greater susceptibility to various drugs—anesthetics" (p. 14).

These characteristics of reflex conduction are investigated in great detail and variety of conditions in order to determine what part of the mechanism of the reflex arc is their immediate seat. It is evident from the fact that the white matter of the nervous system consists in nerve trunks that the seat of the characteristics peculiar to reflex arcs must be found in the gray matter, and since reflex arcs always consist in at least three neurones, it is at once suggested that the synapses may be the mechanism in question. Much strong evidence is adduced to confirm this suggestion, and the author agrees with W. McDougall in attaching to the synapse primary importance in the physiology of the nervous system.

The method of the organization of reflexes into simultaneous and successive combinations so as to bring about complex actions extended both spatially and serially, is determined by comprehensive and detailed experiments. The important structure in the combination of reflexes is the 'common path,' especially the 'final common path.' In the common path stimuli from diverse parts of the organism, if allied, cooperate in bringing about the reaction, and if antagonistic they compete for the use of the 'effector,' with the result that one is effective and the other is inoperative. The common path, then, is the means of coordinating the various reflexes, and it is at its synapse that the phenomena of summation, 'bahnung,' interference, inhibition, etc., take place.

The author then traces the process by which the cerebrum acquires dominance over the rest of the nervous system. In the course of development the leading segment of a plurisegmental animal becomes highly differentiated and becomes possessed of receptors of a high degree of sensitivity. These receptors, the eye, ear and olfactory organ, become sensitive to stimuli from distant objects, and are therefore called 'distance receptors.' These receptors enormously increase the range of the animal's adaptation to its environment. Since their reactions require the activity of the whole organism, the other, more partial reflexes become mere appendages. The brain as the 'ganglion' of the distance receptors becomes in the higher animals, then, the dominant part of the nervous system, and in man, 'reason,' based on the power of associative recall, becomes the supreme guide to conduct.

In the last lecture[1] the author takes up a problem which has direct psychological bearing, *viz.*, the problem of 'sensual fusion.' Nervous integration has been seen to take place through the fusion of nervous impulses in the same 'final common path.' The question is whether the sensory elements which are related in the sense percept are fused primarily for the percept, or whether the sensations are first elaborated and

[1] This lecture appeared originally in the *British Journal of Psychology*, Vol. I., Pt. I.

then fused in the percept secondarily. "To what extent is the visual singleness (in the case of binocular fusion) due to a direct confluence of the sensory paths?"

The question was investigated by the determination of flicker thresholds in binocular fusion of coincident and alternating stimuli, in comparison with the fusion of like stimuli in a single eye. It was found that the light phases in one eye (so far as sensual effect goes) do not interfere nor combine with coincident dark phases of the other, or, to put it in another way, stimulations of alternate right and left arrangement do not combine as series of additive stimuli as would be the case if there were confluence of the sensory fibers before the elaboration of the sensation.

A change in the frequency of one component altered the common threshold to a point between the extremes of the separate thresholds. This process may be taken to be analogous to that by which the brightness resulting from the synchronous stimulation of the two eyes by lights of different degrees of brightness is not the sum of both, but is near the arithmetical mean between them. Both processes are referable to perceptual rather than sensory fusion. The phenomena of the predominance of contours in binocular and uniocular fusion point to the same conclusion.

The anatomical fact that the fibers from the same side of each retina (afferent fibers from 'corresponding points') are projected on the same occipital cortex, which seems to present a difficulty to this view, is explained upon consideration of the other fact that stimulations of corresponding points of the two retinæ require conjugate movement of the two eyes to bring the point on the foveæ. It is therefore natural that fibers from corresponding points should meet in the same 'final common path.' This explanation is supported by the fact that stimulation of a point in the visual cortex of the occipital region does cause conjugate movement of the two eyes in the opposite direction. The fusion of sensations in a perception, then, is seen to be parallel to, if not incidental to, the fusion of afferent arcs in the 'final common path' to bring about the motor reaction.

It is evident that the whole trend of the book, though it is primarily physiological, is a strong argument for some sort of 'motor theory' of consciousness. In the first place, as the culmination in the psychological discussion of the last chapter indicates, physiology has immediate significance for psychology, and *vice versa*. In fact, the author himself says, at the opening of the last lecture, that the brain must be considered primarily as the organ of mentality, and therefore can not be fully investigated from the purely physiological point of view; and in closing the lecture he says: "It is around the cerebrum [which he has called the organ of mentality], its physiological attributes, that the main interest of biology must ultimately turn."

It follows, then, from the treatment of the total reflex as the fundamental unit instead of the afferent or the efferent part of the arc, and the treatment of the simultaneous and successive integrations of the

nervous system as centered about the *relation between the afferent and efferent impulse* at the 'final common path,' that there is strong presumption that conscious development is similarly centered about the whole receptive-motor process, and not about one abstract element of it. This position receives strong confirmation from the experiment on binocular fusion in perception.

The book is accompanied by an exhaustive bibliography, and the author supports each step in his argument by frequent reference to his own extensive and minute experiments as well as to the results found by other investigators. Numerous reproductions of myograph curves, etc., illustrate the text.

The original lectures which are reproduced in this volume were delivered at Yale University as the Silliman Memorial Lectures for 1904.

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Some Important Situations and their Attitudes. A. H. LLOYD. *Psychological Review,* January, 1907. Pp. 37–53.

'The situation' in general is the fact of conflict, specific situations involving specific concrete conflicts. Conflict may be stated in various ways, as, the opposition of an existing structure to its environment, the struggle of the personal or variable in man against the habitual, the war of second nature against first nature. The resolving of the conflict takes place through four principal moments. First, there is the *moral situation,* in which existing human habits or laws are confronted by some emergency to which they are not adequate. This induces the *ethical attitude,* which is, in effect, respect for abstract law. "Lawfulness . . . rather than the specific law or structure, is the concern of the ethical attitude." Clinging to the human law, man is set over against nature and regards nature with blind fear. The second moment is the *artistic situation,* which induces the *esthetic attitude.* In the esthetic attitude man no longer feels himself opposed to nature, but in truce with nature. He becomes rather an observer, and the conflict would seem to be now between two different elements in nature, the man being more withdrawn from active participation. His emotion is now one of awe instead of fear. The third moment is the *practical situation* inducing the cognitional or *reflective attitude.* In this attitude man, instead of blindly fearing nature, turns upon her a speculative eye. What before he opposed he now impersonally examines. The reflective attitude fulfills itself in, fourth, the *natural situation.* Here we find nature overwhelming the human structural element which opposed her. "The reflective attitude is always an invitation to nature to realize herself." In this realization of nature the old human habits and laws are broken down and reorganized into a new structure. The attitude corresponding to this final solution of conflict is called the *spiritual,* volitional or religious. In it the personal and the natural are reconciled, and the human being recognizes nature in himself.

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JOURNALS AND NEW BOOKS

RIVISTA FILOSOFICA. November–December, 1906. *Sulla bara dell' Amico* (pp. 565–567): G. CELORIA. – The address delivered at the funeral of Carlo Cantoni by the President of the Royal Lombard Institute of Sciences and Director of the Astronomical Observatory of Brera. *C. Cantoni e la teoria della conoscenza* (pp. 568–592): B. VARISCO. – A sympathetic but critical statement of Cantoni's views. Philosophical progress depends upon the way in which questions are formulated. Objects of thought presuppose an absolute reality. Space and time are constructions subsequent to intelligence, but they are representations that presume the subject. The existence of absolute reality can not be proved, but it is spontaneously and inevitably taken for granted. *Cantoni e Vico* (pp. 593–606): A. FAGGI. – An account of Cantoni's criticisms of Vico in an early work, and a defense of Vico. Vico held that we know what we produce or construct. His views were profound, but vague. Cantoni preferred opinions more simple and definite. *La morale di C. Cantoni* (pp. 607–620): G. VIDARI. – Cantoni was a devoted follower of Kant. The purpose of morality is to maintain the closest possible union between men, and to guarantee religion by deriving it from morality. Cantoni sought to replace Kant's rigidity and formalism by a principle of disinterested impartiality. *Carlo Cantoni e l'educazione nazionale* (pp. 621–632); A. PIAZZI. – An account of Cantoni's influence on university reform. *Filosofia e Scienza* (pp. 633–660): G. VILLA. – Science and philosophy have different functions. Science is analysis, positive research, concrete knowledge. Philosophy is synthesis, discussion of problems, hypothetical knowledge. Philosophy is the effort to gain a total, synthetic construction, which is never final. *S. Bernardo e gli ultimi canti del Paradiso* (pp. 661–697): G. ZUCCANTE. – Continued from previous number. S. Bernard expresses the poetic veneration of the Madonna, and the ideal of mystic contemplation of the vision of God, that are characteristic of the later cantos of the 'Paradiso.' *Rassegna Bibliografica. Nuove Riviste. Sommari delle Riviste Straniere. Libri Ricevuti. Indice dell' Annata.*

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NOTES AND NEWS

THE reviewer in *Nature* of Montgomery's 'The Analysis of Racial Descent in Animals' makes the following interesting comments on the general subject of organic evolution: "It would be a most fascinating task to trace the evolution of modern methods of dealing with the problems of life. Differentiation has taken place so extraordinarily quickly. The time is long past when one man can attempt to grapple with the whole problem. Not only so, but the time seems to be past when one man can even be interested in the whole problem. Evolutionists may be broadly classified into those to whom the problem of evolution is the problem of the origin of species and those to whom it is the problem of adaptation. The keynote of de Vries's 'Mutationstheorie' is the solution of the problem of species; we even go so far as to say that this is the achievement of de Vries's work. The logical conclusion, the complete working out of the theory of natural selection, is reached in Dr. Archdall Reid's 'Principles of Heredity.' The interest of the two authors is entirely different. De Vries's interest is in the origin of species, Dr. Reid's in natural selection. Darwin's interest was in both; if we look no further than the title of his chief work we can see this—'On the Origin of Species by Means of Natural Selection.' The fact that these two interests have segregated, and the way in which they have segregated, are both very suggestive, and the direction in which they point is the same. The fact of segregation suggests that the association of the two ideas was unnatural, and that they were not capable of union. The way in which they have segregated confirms this suspicion. For those who devote their attention to the question of species reject natural selection, while those who elaborate the theory of natural selection find no support in the phenomenon of specific difference. All possibility of a reconcilement between the divorced ideas is put an end to by Meyrick, who probably knows more about specific difference than any one else. In his handbook of British Lepidoptera he says that, in seeking for the most suitable characters by which species may be distinguished, those which can in any way be regarded as useful to the species must be discarded without more ado. It is not surprising that Darwin's work should have borne fruit which segregated in this way. The case is thoroughly Mendelian. Darwin's work was a cross between a biological theory of evolution and a social and industrial theory of competition. The hybrid, more vigorous than either parent, took the world by storm. We are now witnessing its posterity separating out more or less simply into the two forms which were united in the beginning. Just as every plant in the F_1 generation contains yellow and green peas, and just as it is not until the next that there can be found plants bearing only yellows or only greens, so Darwin's interest was in the 'Origin of Species by Natural Selection,' while now we find de Vries, who is absorbed entirely with the former, and Reid entirely with the latter. The experimental method has its limitations no less than its fascination. It is not merely a paradox to say that in biology those things with which we can

experiment most are those which to the organism matter least. The reason is that we are not the first to start experimenting. Nature has been there before. For example, the range of continuous variation in an organism may either be the direct result of the constitution of the living substance or it may have been determined by the most stringent selection acting since life dawned. If, therefore, we institute experiments on variation—for example, the determination of the effect of heat on the range of variation—we may either be studying one of the simple properties of protoplasm or discovering the limits within which natural selection allows the particular organism dealt with to vary under the conditions of heat, *e. g.*, to which we subject it. The really fundamental processes do not lend themselves to experiment. That is how they have become fundamental. Every one who wishes to train himself to study them should read Professor Montgomery's book."

THE *New York Medical Journal* for May 11 contains a pertinent editorial on 'Our Neglect of Psychiatry,' in which it is pointed out how serious a defect in medical education this neglect is: "In many of our medical schools didactic lectures on mental disorders alone are given. The teaching of psychiatry by didactic lectures is a farce, because of the many intricacies of the subject. In others there are from four to six clinical lectures given in the course of the year, and the student gets a brief glimpse into a field of wide extent and one beset with more difficulties than any other branch of internal medicine. In even the best of our universities psychiatry is more inadequately taught than any other subject in the curriculum. Not only is the subject neglected in medical schools, but the peculiar conditions whereby the insane are isolated and herded together in large and mostly distant asylums makes it impossible for the practitioner to fill the gap which a defective education has made. Further, he has practically no postgraduate opportunities." A more intelligent understanding of mental disease should go far toward preventing a large amount of human degradation and misery. The difficulties in the way of adequate clinical teaching in this country are not easy to overcome, "but these difficulties might be reduced almost to a parity with those that attend clinical teaching in most cases of acute bodily disease. Such instruction must be given almost exclusively in hospital wards, and can hardly be given at all in the lecture rooms and amphitheaters of the schools. It seems highly desirable, therefore, that a large hospital for the insane should be readily accessible from any school which is to teach psychiatry satisfactorily." As illustrating the need of better methods, the writer cites the homicide of Mrs. Lamb, the mother of Mary and Charles Lamb, and adds: "Not many years ago a great corporation became involved, and thousands of stockholders, large and small, lost their fortunes, by reason of an undetected mental disorder in one of the responsible heads of the company. Widespread poverty, distress, a score of suicides and many petty misdemeanors resulted from this crash, one of many due to a similar disease. Of the nearly 3,000 persons admitted into the Bellevue psychopathic pavilion in New York last year, one fourth

had committed some petty misdemeanor, a felony, or a gross act in violation of the law, because of mental disease."

IN 1894 the pupils and admirers of Professor Haeckel, of Jena, became interested in the collection of a fund to pay for the erection of a bust on the occasion of his sixtieth birthday. So considerable a sum has been contributed that a scientific foundation is now thought of. The city council of Jena has provided the land and it is announced that a philogenetic museum will be erected. Professor Haeckel will present to the museum his library and his scientific collections. Contributions are received through *das Rentamt der Universität Jena, Jenergasse 8.*

SWAN SONNENSCHEIN announce that they have in preparation 'The History of Philosophy,' based on the work of Dr. J. E. Erdmann, fifth German edition, revised by Dr. W. B. Erdmann, and edited by W. S. Hough; also 'Lectures in Humanism,' by Professor J. S. MacKenzie, and 'Mental Pathology and its relation to Normal Psychology,' by Professor Storring, translated by Professor T. Loveday.

CHARLES H. HINTON, examiner in the Patent Office and known for his publications in mathematics and logic, died suddenly in Washington, on April 30. Mr. Hinton was born in London; graduated from Oxford University, and was sixty-three years old at the time of his death.

DR. FRANCIS GALTON has been appointed to deliver the Herbert Spencer lecture for 1907, at Oxford, and proposes to lecture this term on 'Probability the Foundation of Eugenics.'

DR. F. L. WELLS, lecturer in psychology in Columbia University, has been elected to the position of pathological psychologist in the McLean Hospital, at Waverley, Mass.

MR. C. H. HAWES, of Cambridge University, has been appointed lecturer in anthropology at the University of Wisconsin.

MR. A. B. SUTHERLAND has been appointed assistant in philosophy at the University of Wisconsin.

MR. GREGORY D. WALCOTT, Ph.D. (Columbia), of Blackburn College, has been elected professor of philosophy in Hamline University.

DR. N. ACH, docent for psychology at Marburg, has been called to the chair of philosophy at Marburg.